1 (currently amended). A method for analyzing a powder sample of a substance, the method comprising:

providing a powder sample of a substance in a sample holder that has at least one window that is substantially transparent to electromagnetic radiation in a selected wavelength region;

performing at least one of vibration motion, rotation motion and translation motion ("motion") on at least one of the sample, the sample holder and the at least one sample holder window at each of one or more selected motion frequencies, to thereby cause grains of the sample to move in a random manner relative to each other;

directing electromagnetic radiation having a wavelength in the selected wavelength region ("incident light") toward a portion of the sample shown in the at least one window; and

for at least one selected motion frequency, performing at least one of a diffraction measurement, a transmission or absorption measurement, a reflection measurement, a fluorescence measurement and a spectroscopic measurement on incident light that has interacted with the sample, at a wavelength determined by a wavelength of the incident light.

2 (original). The method of claim 1, further comprising choosing said wavelength determined by said incident light wavelength to be substantially equal to said incident light wavelength.

3 (currently amended). The method of claim 1, further comprising choosing said wavelength determined by said incident light wavelength to be an expected wavelength for fluorescence of said ~~substance~~ sample when exposed to irradiation by said incident light.

4 (currently amended). The method of claim 1, further comprising choosing said wavelength determined by said incident light wavelength to be an expected Raman shift wavelength for Raman spectroscopy performed on said ~~substance~~ sample using irradiation by said incident light.

5 (original). The method of claim 1, further comprising performing said at least one motion on said sample holder in a direction that is substantially parallel to an axis of said sample holder

6 (original). The method of claim 1, further comprising performing said at least one motion on said sample holder in a direction that is substantially perpendicular to an axis of said sample holder

7 (original). The method of claim 1, further comprising rotating said sample holder at a selected angular frequency while said at least one of said sample, said sample holder and said sample holder window is undergoing said motion.

8 (original). The method of claim 1, further comprising translating said sample at a selected translation rate while said at least one of said sample, said sample holder and said sample holder window is undergoing said motion.

9 (original). The method of claim 1, further comprising:

providing said sample holder with a second window on a surface of said holder that faces and is opposed to said first window, is spaced apart from said first window by a selected distance, and is substantially transparent to radiation in a second selected wavelength region;

performing said measurement, using transmission or absorption of said incident light through said first window, at a selected incidence angle relative to a normal to a plane of said first window, through said sample and through the second window,

10 (original). The method of claim 9, further comprising selecting said second wavelength region to be substantially equal to said first wavelength region.

11 (currently amended). The method of claim 9, further comprising selecting said second wavelength region to include an expected wavelength for fluorescence of said ~~substance~~ sample when exposed to irradiation by said incident light.

12 (currently amended). The method of claim 9, further comprising selecting said second wavelength region to include an expected Raman shift wavelength for light emitted by said ~~substance~~ sample when exposed to irradiation by said incident light.

13 (original). The method of claim 9, further comprising

providing said sample holder with a third window and with a fourth window that faces and is opposed to the third window, is spaced apart from the third window by a selected second distance, and is substantially transparent to radiation in a third selected wavelength region; and

performing at least one of a transmission or absorption measurement of said incident light and a fluorescence measurement of said incident light that passes through the third window, through said sample and through the fourth window.

14 (original). The method of claim 13, further comprising selecting said second distance to be different from said first distance, to thereby provide at least two different sample thicknesses to interact with said incident light.

15 (original). The method of claim 9, further comprising

providing said sample holder with a third window and with a fourth window that faces and is opposed to the third window, is spaced apart from the third window by a selected second distance, and is substantially transparent to radiation in a third selected wavelength region; and

performing at least one of a transmission or absorption measurement of said incident light and a fluorescence measurement of said incident light that passes through the third window, through said sample and through the fourth window, substantially simultaneously with performance of said measurement for said light incident on said first window.

16 (original). The method of claim 1, further comprising providing said sample holder as comprising a capillary tube that receives said sample and allows said motion of said sample within the capillary tube.

17 (currently amended). The method of claim 1, further comprising performing said measurement by a process comprising:

passing said incident light through said at least one window from a first window side to a second window side at a selected incidence angle relative to a normal to a plane of said at least one window;

allowing said incident light to be diffracted by at least one grain of said ~~substance~~ sample ; and

passing said incident light through said at least one window from the second window side to the first window side.

18 (original). The method of claim 1, further comprising performing said measurement, using reflection of said incident light.

19 (original). The method of claim 1, further comprising providing a selected flow of a gas in a selected direction within said sample holder to thereby promote transport of a portion of said sample in the selected direction.

20 (original). The method of claim 1, further comprising:

orienting an axis of said sample holder in a direction having a non-zero vector component that is parallel to a vector of local gravitational force; and

performing said motion on said sample holder so that said powder sample is caused to move from a first location to a second location that is substantially below the first location under a combined influence of said motion and the gravitational force.

21 (original). The method of claim 1, further comprising:

providing an array of at least first and second spaced apart vibration actuators along an axis of said holder, where each actuator vibrates at the same one of said selected frequencies and has an independently selectable phase; and

selecting the phase of the first actuator relative to the phase of the second actuator to promote propagation of a wave along the holder axis.

22 (original). The method of claim 1, further comprising providing said at least one window with a thickness that lies in a range 1-20 μm.

23 (currently amended). The method of claim 1, further comprising:

suspending said powder sample in a selected liquid, having a selected liquid refractive index, within said sample holder;

performing said measurement on at least one grain in said powder sample with a first angular orientation and with a second angular orientation[[s]] of the grain relative to said at least one window; and

estimating a maximum refractive index and a minimum refractive index for the at least one grain from the measurements with the first and second angular orientations.

24 (currently amended). The method of claim 1, further comprising orienting an axis of said sample holder so that at least a <u>second</u> portion of said sample that is initially outside said sample holder is caused to move into said sample holder.

25 (currently amended). The method of claim 1, further comprising orienting an axis of said sample holder so that at least a <u>second</u> portion of said sample that is initially in said sample holder is caused to move out of said sample holder.

Respectfully Submitted,

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